BEFORE THE UNITED STATES PATENTS AND TRADEMARKS OFFICE

Inventor:	Stephen Fitzgerald et al
Serial No:	10/672,060
Filed:	29 September 2003
Title:	TUBULAR BASEBALL BATS WITH VARIABLE BARRELS
Confirm. No.:	4727
Art Unit:	3711
Our File:	CECOM-04.US (2043-3-04-10)

June 7, 2006
By fax only
1-571-273-8300

Mail Stop Amendment
The Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Declaration under 37 CFR 1.132
Evidence submitted to traverse the rejection

1. I am one of the inventors named in respect of the above application. As part of my role in association with the invention, I was responsible in the course of my engagement by CE Composites Baseball Inc as an independent consultant for the engineering design and details for purposes of production of new baseball bats.

2. My background training and experience in respect of this field are as follows:

a) Masters degree in Mechanical Engineering with specialty in design of composite structures.

b) 15+ years designing and building sporting goods products, including worlds first design of commercially successful composite baseball and softball bats. My résumé is attached to a Schedule C hereto.

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3. I have reviewed the reference United States Patent Application 20020091022 published July 11, 2002 for an invention entitled "Insert for a bat having an improved seam orientation" by *Fritzke,* Mark A. et al. The Examiner has rejected claims in the present application as being either anticipated under 35 USC 102(b) or obvious under 35 USC 103 in view of Fritzke '022, Figures 14, and 15.

4. I was not aware of this reference or any similar related information at the time that I participated in the making of the present invention. The present invention resulted from a business need to lower the bat performance of a bat in widespread use that had been ruled illegal by a governing association due to a lowering of the bat performance standard. The commercially successful solution using the present invention was to increase the radial stiffness in the mid region of the bat barrel corresponding to the sweet spot. The recertification test results from an association-approved external test laboratory showed that we had achieved our objective, and the redesigned bat was certified as legal for association play. Further, the test results showed that an unexpected result of utilizing the present invention was the broadening of the sweet spot size, as shown in Figure 10 of the original submission of the present invention.

5. From my experience with baseball bats, I understand "sweet spot" to mean the portion near the mid-point of the barrel length where the ball-bat collision is the most energy efficient. Sweet spot is measured by testing the rebound speed of a ball off of a bat at various points along the barrel. Dr. Dan Russell, an expert in the physics of baseball bats, [www.kettering.edu/~drussell/bats.html], shows a good approximation of the sweet spot as being a region about 2 inches wide. When I first commenced working on the present invention I had never encountered any discussion in the literature or disclosure in the field that addressed controlling the sweet spot in the matter achieved by the present invention.

6. As part of the original procedure for establishing the invention as disclosed in the above application, tests were carried out on the performance of a prototype bat. Field tests were done with live batters and gave qualitative feedback that we had indeed increased the size of the sweet spot. Additionally laboratory tests on modified aluminium / composite bats indicated that the performance along the barrel was made more uniform (see Figure 10 in our original submission). These test results demonstrated that we had achieved a means for enlarging the size of the sweet spot within a baseball bat.

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7. I have reviewed the disclosure associated with the reference United States Patent Application 20020091022 with a view to understanding the extent to which this disclosure may address the issue of the presence of a sweet spot within a bat. I note that there is no reference at any point in this disclosure as to such a characteristic. I further note that Figures 14 and 15 depict and refer to a means for reinforcing a portion of the barrel of a bat between the extreme ends of the barrel. The reinforcing done here is simply wrapping the high impact areas of the barrel in a composite "tape" made of fibers at zero or ninety degrees. Such angles support Fritzke's objective of increasing durability but, are not supportive of a significant localized increase in radial stiffness of the barrel in terms of broadening the sweet spot as outlined in the present patent application. So much of the barrel length is wrapped in tape that the performance of virtually the entire bat would thereby be degraded. The invention in which I was involved addressed preferably radial stiffening of only the peak performance area, generally the sweet spot area near the centre of the barrel length, and not stiffening the areas immediately adjacent to the sweet spot area. Such localized radial stiffening can be accomplished in a number of ways: e.g. controlling fiber alignments along the bat length, and/or the types of fibers chosen, their dernier or layout density and/or the thickness of the barrel wall - para [0053], or adding an independent stiffener.

8. In analyzing this prior art reference, I note that the teaching in the disclosure does not lead clearly and directly to providing a bat with only a mid-portion of the barrel wall that has a higher radial stiffness than that present within the lateral two regions, on either side of the mid portion in a way that would significantly broaden the sweet spot. I say this because the description of the layers of increased thickness associated with Figures 14 and 15 locate those layers of increased thickness in accordance with the drawing attached as Schedule A hereto. From the drawings in Schedule A depicting the Fritzke Figure 14 and 15 embodiments, I do not interpret the region of increased thickness to be located only in the mid-portion of the barrel wall that contains the sweet spot, with the radial stiffness in the mid- portion being greater than the radial stiffness in the two lateral regions. In Figure 15 the lateral regions are actually reinforced more than the mid-portion, which teaches away from the present invention.

9. As an independent consultant I developed software for analyzing the projected performance of a bat in terms of its radial wall stiffness, as measured by assessing the radial stiffness of annular segments of the bat, taken independently of the context of being part of a bat as a whole, the "hoop" radial stiffness. This software is used to develop new designs for bats within the company where I am

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employed.

10. I have applied this software to analyze such radial stiffness as would be present in a variety of bats built in accordance with the disclosure of the present application and in accordance with a bat design based upon the Fritzke disclosure. Schedule B sets out the results of that analysis.

11. In summary, bats built in accordance with the 0.005" to 0.040" stiffened thickness increase of the present application would have a radial stiffness increase of 89% to 186 % at the sweet spot. In my experience working on bat designs utilizing the present invention, I have concluded that a higher localized radial stiffness increase allows a narrow region to be stiffened and a meaningful widening of the sweet spot to be obtained while still maintaining maximum bat performance.

12. I have reviewed United States Patent Application 20020091022 with the object of carrying out a similar analysis on the bats as described therein, particularly Figure 14. In the application a composite strengthened aluminum insert for use in a double wall (DW) aluminum bat is disclosed. I note that this reference does not disclose a single walled (SW) bat, nor does it give dimensions of the thickness of the wall of the insert depicted in Figures 14 and 15 or the wall of the frame of the double wall bat in which the insert would be utilized as a DW bat. . In order to carry-out such an analysis, I used the dimensions of the aluminum insert and frame as disclosed in Fritzke's paragraph [0063], which values in terms of wall thickness conform to common industry practice in the building of double-wall aluminum bats. I also had to assume that the modulus of the fiber-reinforced polymer composite used in this reference was similar to published handbook values. In the case where two layers of polymer composite material have been employed, I have calculated the modulus of elasticity on the basis of averaging values, taking into account respective layer thicknesses. I believe these are reasonable assumptions.

13. On this basis, I applied the software to the bat so described in the same manner as I had done with respect to bats in accordance with the disclosure of the present invention, and obtained data in respect of the Fritzke disclosure, as set-out in Schedule B attached hereto. On reviewing this comparison, I observe that the Fritzke invention provided an increase in radial stiffness of 25%, which is well below the range of the present invention and not sufficient to significantly enlarge the sweet spot size as achieved by the present invention.

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14. My analysis shows that the present invention is based on a significant, targeted, stiffening of only a relatively small section of the barrel, the mid-portion only, in order to enlarge the sweet spot which results from a radial stiffness increase of 89% to 186%. The Fritzke application describes wrapping a substantial 8.5 inches length along the barrel, with a first layer composite tape .003 inches in thickness, and then a second layer .0055 inches in thickness which extends 4 inches along the barrel. The calculated 25% increase in radial stiffness referenced in Schedule B attached hereto was based upon an assumed increase in barrel wall thickness of 0.0085 inches. Accordingly, considering the 0.0055 inches thick, four-inch long stiffened area of the Fritzke Figure 14 disclosure by itself, the increase in radial stiffness compared to the stiffness of the directly adjacent lateral regions would be less than 25%. I attribute the low value for radial stiffness increase in the Fritzke disclosure to the minimal change in thickness of the added composite layers.

15. I HEREBY declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated at Ottawa, Ontario, Canada, this June 7, 2006

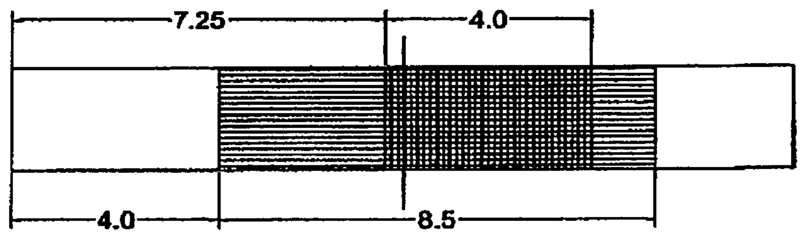
Stephen Fitzgerald

Stephen Fitzgerald , P.Eng., MASc.

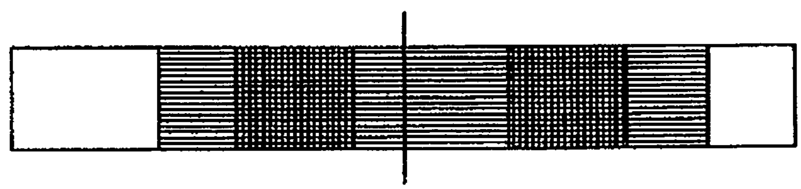
S.F.

SCHEDULE "A"

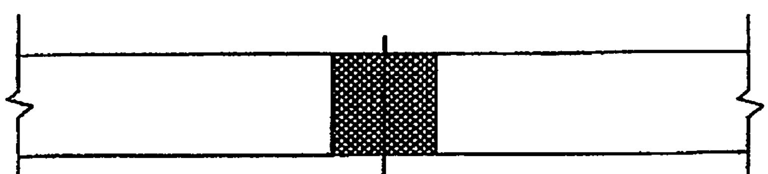
CENTRELINE



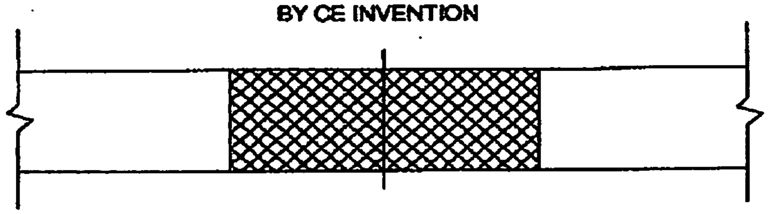
AFTER FRITZKE 2002, FIG 14 - (SCALED)



AFTER FRITZKE 2002, FIG 15 - (SCALED)



MINIMUM 2" REGION ONLY BEING STIFFEND
BY CE INVENTION



MAXIMUM 6" REGION ONLY BEING STIFFEND
BY CE INVENTION

Schedule "B"

Effect of adding composite layers to baseball bat barrels on radial stiffness.

	1	2	3	4
	CE Minimum Thickness Composite YB SW	**CE Prefferred Thickness Composite SP DW**	**CE Maximum Thickness Composite AB SW**	**Fritzke Disclosed Thickness Aluminum SP DW**
Modulus and Thickness				
Frame Modulus (lb/sq.in)	1.10E+06	1.41E+06	1.01E+06	1.05E+07
Insert Modulus (lb/sq.in)	1.10E+06	1.11E+06	1.01E+06	1.05E+07
Frame Wall Thickness (in)	0.123	0.110	0.195	0.050
Insert Wall thickness (in)	-	0.080	-	0.054
	0.123	0.190	0.195	0.104
Unreinforced Stiffness				
Frame Stiffness (lb/sq.in x in^3)	171	156	624	109
Insert Stiffness (lb/sq.in x in^3)	-	47	-	138
Total of Frame plus Insert	171	204	624	247
Reinforcement Thickness				
Frame Stiffener Modulus (lb/sq.in)	1.02E+07	n/a	3.57E+06	n/a
Frame Stiffener Thickness (in)	0.0050	n/a	0.0400	n/a
Insert Stiffener Modulus (lb/sq.in)	n/a	4.37E+06	n/a	1.16E+07
Insert Stiffener thickness (in)	n/a	0.0200	n/a	0.0085
Stiffened Thickness				
Frame Wall Thickness (in)	0.128	0.110	0.235	0.050
Insert Wall thickness (in)	-	0.100	-	0.063
	0.128	0.210	0.235	0.113
Reinforced Stiffness				
Frame Stiffness (lb/sq.in x in^3)	322	156	1,786	109
Insert Stiffness (lb/sq.in x in^3)	-	315	-	200
Total of Frame plus Insert	322	471	1,786	310
Percentage Increase	+89%	+131%	+186%	+25%

1 = Minimum thickness for typical CE Youth bat.
2 = Preffered thickness for typical CE composite slow pitch bat.
3 = Maximum thickness for typical CE adult baseball bat.
4 = Fritzke's dimensions, disclosed in [0063], for typical double wall aluminum bat.

Stiffness values are the radial direction flexural stiffness of the barrel walls.

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Schedule "C"

STEPHEN B. FITZGERALD, MASc, P.Eng.
2103 Hubbard Crescent, Ottawa, Ontario K1J 6L3
(613) 746-4229, email: pcomp@istar.ca

2005- Vice President, Operations, CE Composites, Inc., Ottawa, Ontario
- Responsible for new product development, applied research and development and manufacturing operations for a composite baseball bat manufacturing facility.

1999- 2002 Sr. Design Engineer, G.N. Plastics Ltd., Chester, Nova Scotia
- Designed innovative machinery for the thermoforming industry, including advanced multi-axis robotic packaging equipment and a patented new type of thermoforming machine capable of doubling the performance of the best machines currently on the market.

1995-2005 Consulting Engineer, Practical Composites, Inc., Halifax, Nova Scotia
- Founded an engineering consulting company to provide product design and production support, composite stress analysis, customer technical support, software development and testing services the advanced composites industry. Customers include manufacturers, boat builders, and material suppliers in USA & Canada.
- Developed laminate analysis software for composites design. Designed composite inline skate chassis, hockey sticks, baseball bats.

1994-1995 Engineering Manager, Canstar Composite Technologies, Inc., Ottawa, Ontario
- Designed complete line of advanced composite hockey sticks and blades and a production facility.
- Managed all aspects of startup, including setup of production lines, product design, quality control, business planning, staffing and training. Processes include pultrusion, filament winding, lay-up, SRIM and several proprietary manufacturing methods, including both thermoset and thermoplastic resins.

1992-1994 Sr. Engineer / General Manager, GCT Technologies, Ltd., Boston, MA
- Managed a firm specializing in product development and contract research in automated manufacturing.
- Developed new composite products and managed their production.
- Managed smart structures program studying the embedding of sensors and actuators in thin walled tubes.
- Made prototype components for U.S. Space Station and for Stealth Aircraft.

1990-1992 Mechanical Engineer, General Composite Technology Ltd., Halifax, Nova Scotia
- Designed and built pultruded cored panels for roofing and shipping containers made from flame retardant composites.
- Managed several test programs to determine design properties for composite materials and structures.
- Invented methods of imbedding optical fiber sensors in pultruded parts for later retrieval.
- Developed models for predicting manufacturing costs of advanced composites for Canadian Space Agency.
- Authored a study on effects of the marine environment on composite materials.

1989-1990 Research Assistant, Advanced Materials Engineering Center, Halifax, Nova Scotia
- Performed research on surface coatings for steel, concrete and composites in marine environments.
- Performed a wide range of testing of composites including mechanical and thermal analysis. Summer and part-time job.

EDUCATION:

MASc. in Mechanical Engineering
Thesis: Computer Aided Design and Optimization of Pultruded Structural Profiles
Technical University of Nova Scotia, Halifax N.S., Canada

Bachelor of Mechanical Engineering with Distinction, and a Sexton Scholar
Technical University of Nova Scotia, Halifax, Nova Scotia

Bachelor of Science in Computing Science / Diploma of Engineering
Dalhousie University, Halifax, Nova Scotia

"Finite Element Analysis of Composite Structures", Course Conducted by R. Pat Gilliam for Swansen Service Corporation, Huntington Beach, California

"Environmental Effects on Composite Materials", Course Conducted by Dr. Donald F. Adams, Head of the Composite Materials Research Group, University of Wyoming

Received Natural Sciences and Engineering Research Council (N.S.E.R.C.) Undergraduate Research Grant and N.S.E.R.C. Postgraduate Scholarship.

Listing of patents and published papers available on request.

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BEFORE THE UNITED STATES PATENTS AND TRADEMARKS OFFICE

Inventor:	Stephen Fitzgerald et al
Serial No:	10/672,060
Filed:	29 September 2003
Title:	TUBULAR BASEBALL BATS WITH VARIABLE STIFFNESS BARRELS
Confirm. No.:	4727
Art Unit:	3711
Our File:	CECOM-04.US (2043-3-04-10)

Interview Summary 37 CFR 1.133 (b)

Four telephone interviews with the examiner were held, as follows:

1) February 8, 2006 - applicant's attorney, David J. French
2) March 1, 2006 - applicant inventor Terry Sutherland
3) March 6, 2006 - applicant inventor Terry Sutherland
4) March 6, 2006 - applicant's attorney, David J. French

All of these interviews were initiated by the applicant.

In the first interview, the attorney request clarification as to why claims were withdrawn pursuant to the election requirement. The scope of the elected species, Figure 6, was discussed. The attorney inquired as to the appeal alternatives to the Board of Appeals or to the Assistant Commissioner.

The examiner has issued interview summary forms with respect to interviews numerals 2) and 3) and the applicant confirms the description of the interviews as provided by the examiner.

In the last interview, the attorney inquired of the examiner whether, in filing a continuation application, amendments approved in the present application should be integrated into the continuing application, or should be offered as amendments to be entered directly upon filing. The examiner expressed no opinion as to the preferred manner of proceeding, but observed that new matter objections could be raised by an examiner at any time.

Respectfully submitted,

Stephen Fitzgerald et al

per David J. French

David J. French
Reg. No. 31229

P.O. Box 2486, Stn. D,
Ottawa, Canada LlP 5W6
Telephone: 6l3-567-7824 x232 x231
Telefax: 6l3-567-4689